REMARKS

Claims 1-12 were pending in the application. The Examiner has again rejected Claim 12 under 35 USC 101 as directed to non-statutory subject matter. Applicants have amended Claim 12 to expressly recite the computer readable storage medium. Additional amendments to the language of the claims have been made to improve readability thereof. No new matter is added by any of the amendments.

The Examiner has newly rejected Claims 1-12 under 35 USC 102(b) as anticipated by Komori. For the reasons set forth below, Applicants believe that the claims are patentable over the cited art.

The present system and method for speech recognition recognizes original speech even when the original speech is superimposed with an echo. The Komori patent is directed to noise, whereas the present invention is directed to echo effect. Background noise and echoes are two different types of environmental influence on speech recognition, as detailed in the Background Section of the present application, with echoes having generally longer duration than impulse noise and having greater "speech-like" characteristics than background noises such as light buzz, etc. As pointed out by the present Specification, an echo

may be superimposed on an input speech signal in addition to other environmental noise.

Prior art approaches to noise adaptation, such as that taught by Komori, seek to identify the noise "in a non-speech interval" (see: Komori at Col. 2, lines 3-5) and effectively subtract the noise from the speech signal to improve speech recognition. However, a speech signal with a superimposed echo is not going to have non-speech intervals during which the echo can be evaluated. By its very nature, an echo is a speech signal. Clearly, therefore, the Komori approach is not anticipatory or even useful for the echo problem.

What the present invention provides is a way to perform speech recognition by determining an echo prediction coefficient "showing a rate of an echo to be imposed from a frame in the past to the frame to be evaluated at the current time point" (see: page 24, lines 8-11) The present application expressly teaches that "in consideration of the long impulse response, an echo can be sufficiently simulated even if the echo is assumed to be superimposed onto a speech signal $0(\omega, t)$ to be determined at the current time point while being dependent on a speech signal $0(\omega, tp)$ in the immediately previous frame. That is, by using the formula (2) above to determine acoustic

model data with the highest likelihood for a speech signal from a predetermined acoustic model data and the value of α (i.e., the echo prediction coefficient), it is possible to use a corresponding language model data to perform speech recognition using only a speech signal from one channel" (page 25, lines 6-15).

Applicants respectfully assert that the Komori patent does not anticipate the invention as claimed. Komori, as noted above, teaches a system and method for speech processing using a noise-adaptive PMC model. Komori detects noise in a non-speech interval (Col. 2, lines 3-5) and produces a noise model (noise HMM 202), which is used with the speech model (speech HMM 203) to produce a noise-adaptive speech model (see: Col. 5, lines 49-56). Komori does not teach or suggest generating an echo adaptation model from a speech signal acquired immediately prior to a current speech signal, which prior speech signal will at least exhibit the echo speech characteristics of the present speech signal and may even include the input speech component which corresponds to (i.e., is causally correlated to) the echo in the present speech signal.

With specific reference to the language of the independent claims, Komori does not teach a speech recognition steps and means for storing a feature quantity

acquired from a current speech signal for each frame.
Komori teaches a sound analysis section which stores
received speech signals; but Komori does not teach or
suggest storing a speech feature quantity acquired from a
speech signal.

With reference to the claim features of steps and
means for storing acoustic model data and language model
data, respectively, Applicants acknowledge that Komori
teaches a "Languisitic Search Section" 105 of Fig. 1 and a
Grammar/Dictionary 106.

With reference to the claimed steps and means for an
echo adaptation model to generate echo speech model data
from a prior input speech signal, Applicants respectfully
assert that Komori neither teaches nor suggests the claim
feature. As discussed above, Komori expressly teaches that
a noise model is extracted from a non-speech interval (Col.
2, lines 3-5). Komori does not teach or suggest extracting
or generating an echo speech model from a speech signal.

Applicants further assert that Komori does not teach
or suggest steps or means for using echo speech model data
to generate an adapted acoustic model data. While Komori
does generate a noise-adaptive speech model (Col. 5, lines
49-57), Komori does not teach or suggest generating a model
using echo speech model data.

Finally, Komori does not teach or suggest steps or means for utilizing feature quantity, an echo adapted acoustic model data and a language model data to provide a speech recognition result of a current speech signal. Komori does not store or use a feature quantity of input speech and does not generate or use an echo adapted acoustic model.

Anticipation under 35 USC 102 is established only when a single prior art reference discloses each and every element of a claimed invention. See: In re Schreiber, 128 F. 3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997); In re Paulsen, 30 F. 3d 1475, 1478-1479, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994); In re Spada, 911 F. 2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990) and RCA Corp. v. Applied Digital Data Sys., Inc., 730 F. 2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). Since the Komori patent reference does not teach all of the claimed features, as outlined above, it cannot be concluded that Komori anticipates the invention as set forth in independent Claims 1, 7 and 12. Moreover, a reference which does not anticipate the language of the independent claims cannot be said to anticipate the language of claims which depend therefrom and add limitations thereto. Accordingly,
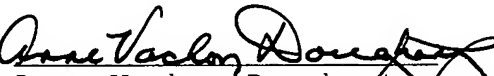
Applicants conclude that the anticipation rejection under 35 USC 102 cannot be sustained against any of Claims 1-12.

Based on the foregoing amendments and remarks, Applicants respectfully request entry of the amendment, reconsideration of the rejections, and issuance of the claims.

Respectfully submitted,

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